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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/730,783	12/07/2000	Sang Jin Oh	2832-0118P	8908
2292	7590	02/17/2004	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			OLSEN, ALLAN W	
			ART UNIT	PAPER NUMBER
			1763	
DATE MAILED: 02/17/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/730,783	Applicant(s) OH ET AL.
	Examiner Allan W Olsen	Art Unit 1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 5, 2003 has been entered.

Claim Objections

Claim 7 is objected to because of the following informality: "forming row" should read --forming roll--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,709,598 issued to Nishio et al. in view of U.S. Patent 5,021,120 issued to Buck et al. and further in view of US Patent 5,858,106 issued to Ohmi et al. (hereinafter, Nishio, Buck and Ohmi).

Nishio teaches a method of forming a patterned abrasive tape. The abrasive tape becomes patterned because it is fabricated upon a patterned forming roll (roll punch). Nishio patterns the forming roll by applying a photoresist and patterning the resist to form an etching mask and then etching the underlying roll. Nishio teaches the etching mask comprises a plurality of regularly spaced mask free parts that each encircle the forming roll (see Response to Arguments, below). Nishio teaches removing the photoresist etching mask before using the patterned roll for its intended purpose. Nishio teaches forming recesses with vertical sidewalls. See: figure 3; column 5, lines 20-32; column 6, lines 24-30 and 45-53; column 7, lines 20-53; and column 8, lines 1-10.

Nishio does not teach removing the masking layer with a cutting bite.

It would have been obvious for one skilled in the art to use a cutting bite to pattern the etching mask for the following reasons. Nishio teaches that a surface, such as that of the forming roll, can be patterned in a variety of ways, including physically or mechanically removing portions of the surface, as well as chemically etching the surface through a patterned mask. Nishio does not discuss at length the well known aspects of such processes. For example, Nishio does not extensively detail the manner in which the etching mask is patterned. It would however, be obvious to create a pattern in the

Art Unit: 1763

etching mask by using any one of the patterning methods that are disclosed by Nishio, for example, engraving or machining on a lathe.

Nishio does not describe removing the workpiece from the etchant prior to the step of removing the photoresist mask.

It would have been obvious to one skilled in the art to remove the workpiece from the etchant prior to the step of removing the etching mask because it is well known that the etchant that will remove the photoresist mask is very different from the etchant that is used to etch the exposed portions of the metallic workpiece. Therefore, the workpiece must be provided with a different etching environment in order to remove the etching mask. The examiner notes that Buck clearly demonstrates this principle.

Nishio does not teach rotating the workpiece in an etchant bath while applying ultrasound to etch the exposed portions of the forming roll.

Buck teaches etching the exposed portions of a workpiece by agitating a workpiece that is immersed in an etchant bath to which ultrasonic energy is being provided by multiple ultrasonic sources that are disposed around the workpiece (abstract; col. 3, lines 4-7; figure 1).

It would have been obvious for one skilled in the art to use ultrasound while etching the exposed portions of Nishio's forming roll because Buck teaches that the application of ultrasound prevents the formation of localized regions of low etchant concentration and thereby provides a highly uniform etching process (column 1, line 17-column 2, line 3).

Neither Nishio nor Buck teaches applying ultrasonic energy to a rotating workpiece while contacting the workpiece with an etchant.

Ohmi teaches immersing a workpiece in an etching solution and applying ultrasound thereto (column 3, lines 26-27). Ohmi teaches moving the workpiece both vertically and laterally while the immersed workpiece is sonicated (column 6, lines 21-40).

It would have been obvious to one skilled in the art to rotate a workpiece during an ultrasound enhanced etching process because rotating the workpiece is a simple means of providing the agitation that is called for by Buck. Also, Ohmi teaches that moving a workpiece within a sonicated bath causes the ultrasound to be more uniformly applied (column 6, line 36). Furthermore, a simple rotation around the horizontal axis of Nishio's forming roll would cause localized portions of the workpiece to simultaneously undergo the vertical and horizontal movements that are called for by Ohmi.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishio, Buck and Ohmi as applied to claim 1 above and further in view of U.S. Patent 5,182,188 issued to Cole, Jr. et al. (hereinafter, Cole).

The combination of Nishio, Buck and Ohmi does not teach the use of a laser beam for the step of partially removing the etching mask.

Cole teaches using a laser beam to partially remove an etching mask (col. 3, line 58).

It would have been obvious for one skilled in the art to use a laser beam to partially remove the etching mask of Nishio because Cole teaches that patterns with very high resolutions can be obtained (column 6, line 48).

Response to Arguments

Applicant's arguments filed March 12, 2003 have been fully considered but they are not persuasive. Applicant's arguments are focused upon the newly added limitation that requires the provision of regularly spaced mask free portions that each encircle the forming roll. Applicant argues "[t]he plate concavities 5 in Nishio et al. are formed in a convex shape on the roll formplate 1 and are therefore very different in structure from the claimed "mask-free parts". However, the examiner does not equate the plate concavities 5 in Nishio to the claimed mask-free parts. The plate concavities 5 in Nishio are formed by etching away the portions of roll 1 that are not protected by an overlying etching mask (i.e. mask free portions). The raised features 9b in Figure 3 of Nishio are formed by filling the concavities 5, which are formed in the mask free regions on an overlying mask. Therefore, the raised pattern of 9b in figure 3 correlates to the mask free portion of the roll 1 etching mask. As can be seen from figure 3, by following the raised portion, 9b in figure 3 in a zigzag manner, each of the regularly spaced zigzag lines encircles the roll.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills, can be reached on 571-272-1439. The fax number for TC1700 is 703-872-9306 (non-after finals and after-final). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1300.

Allan Olsen, Ph.D.
February 9, 2004

